Network Measurements Working Group (NMWG)

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IPPM (RFC2679)
IPPM (RFC 2680)
IPPM (RFC 2681)
Instantaneous Packet Delay Variation (IPPM) – Internet Draft

Want to work with IPPM to define some metrics that are applicable to a much larger community – IPPM is largely aimed at lower level measurement. – The sort of questions the grid community would like ti answer is "how long will it take to get my 3gig file over there".

The following network performance metrics might be of interest to grid applications/middleware.

- Latency (delay)
- Link capacity (maximum possible with no congestion)
- Current capacity (maximum bandwdith possible now)
- Loss (end-to-end packet loss rates)
- Jitter

These metrics are useful for:

- TCP tuning
- Job scheduling / performance estimation (how long will it take . . .)
- QoS selection

TF says - In the Datagrid project we are thinking about parameters that might be useful to high level decisions – need a cost element – How close are two end systems for instance. Need to use a combination of things like this, rather than use of the low level.

Brian – May need some super-metric.

Peter – maybe high bandwidth is not the only thing you need. Maybe you need to know things like will the file be at the destination by a certain time.

Latency –
Sample tools : ping, pingER, Surveyor
Issues: one way delay v RTT (asymmetric)
ICMP v UDP/etc
Precticatablitly ? for how long
http://www.aciri.org/vern . . . . . .

Dictonary to translate between matreics ?
Does iperf = netperf=ttcp results
Can we convert between different tools to get a commonly identifiable metric value ?

Applications may want to directly access diverse raw metrics gathered through multiple systems:

- Accuracy (whenever you convert get inaccuracy – but you increase portability - so need to think about this trade off.

- Complexity – have the complexity of doing the conversion, but if we use raw metrics the (user) applications become more complex – maybe the scheduler is the primary application that uses this metric data – so maybe we are talking about middleware is the user.
- Application portability (single API definition in application)
- Reduced Infrastructure

Capacity Measurements

Capacity is the hardest thing to measure
Active v passive is a really big issue.

Typical TCP sawtooth performance means need for long term (500 sec) test which can be extremely intrusive to the network being tested. The variation of throughput over that period may vary by as much as 6 times. – This is the biggest reason why a single number as a metric is not enough – Can't have much confidence in the number if there is such large variation.

One approach maybe that applications do their own monitoring when operating and then publishing that information for other applications to use.

Another issue particularly on older systes and gigabit networks is how do you know what you are measureing, is it the network delay or internal bus delays. Might also need to measure disk delays. One of the objectives might therefore be to make the other grid WG's aware of the need for good instrumentation.

Proposed NMWG Milestones

Oct 2001	Charter, Structure of metrics document
Feb 2002	Defined Metrics – best practices (include horror stories as well). Structure of Conversion document
July 2002	Release metrics document Draft of conversion document
Fall 2002	Release conversion document

Need to work closely with GMA to make sure their model is capable of accommodating the type of data the NMWG is proposing to produce. Really hoping the GMA will give NMWG all they need, so we can go ahead and give them what they want.

There is a lot of monitoring going on, but much of it is a repacking of the same old tools.

It would be good to have an archive of monitoring data so the networking anoraks can look at it and analyse it.

Definition of the Customers

We talked about the difference between user level applications and middleware functions. Another separate customers are the network engineers.

- User-Level Applications
    - Delay, real-time and interactive applications
        - Passive/published info very interesting
- Middleware

    - Schedulers, need bounds
    - GridFTP
- Network Engineers
    - Interested in Historical Data
- Network Protocols
    - Dynamic Self tuning stacks ?

Note : web100 DoE looking for people to work with of these issues.